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(54) Abstract Title
Internet based printing using a web browser

(57)   A printer connectivity component, cooperable with a web browser to connect a workstation to a printer comprises means to read a configuration file, where the file comprises data defining a connection to the printer, accessed from the browser, and means responsive to the data to enable the workstation to connect to the printer. The component may be a helper application or a browser plug-in. The file may comprises fields indicating the printer's location, a protocol for connecting to the printer and a printer driver. The component may also comprise means (32,34) for installing the protocol and driver if they are not installed on the workstation, or if the driver which is installed is not the latest version.
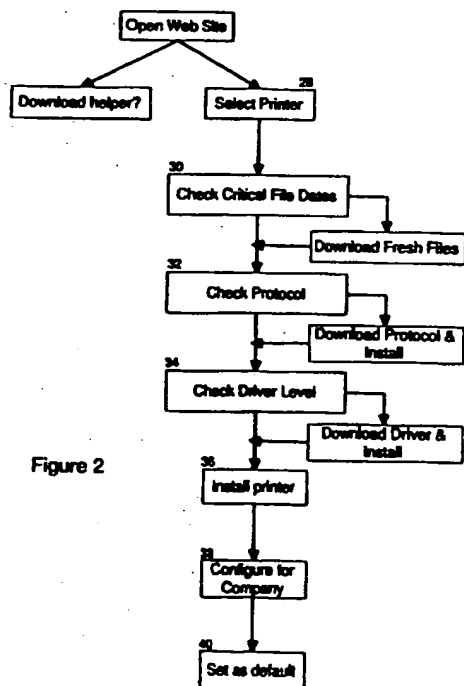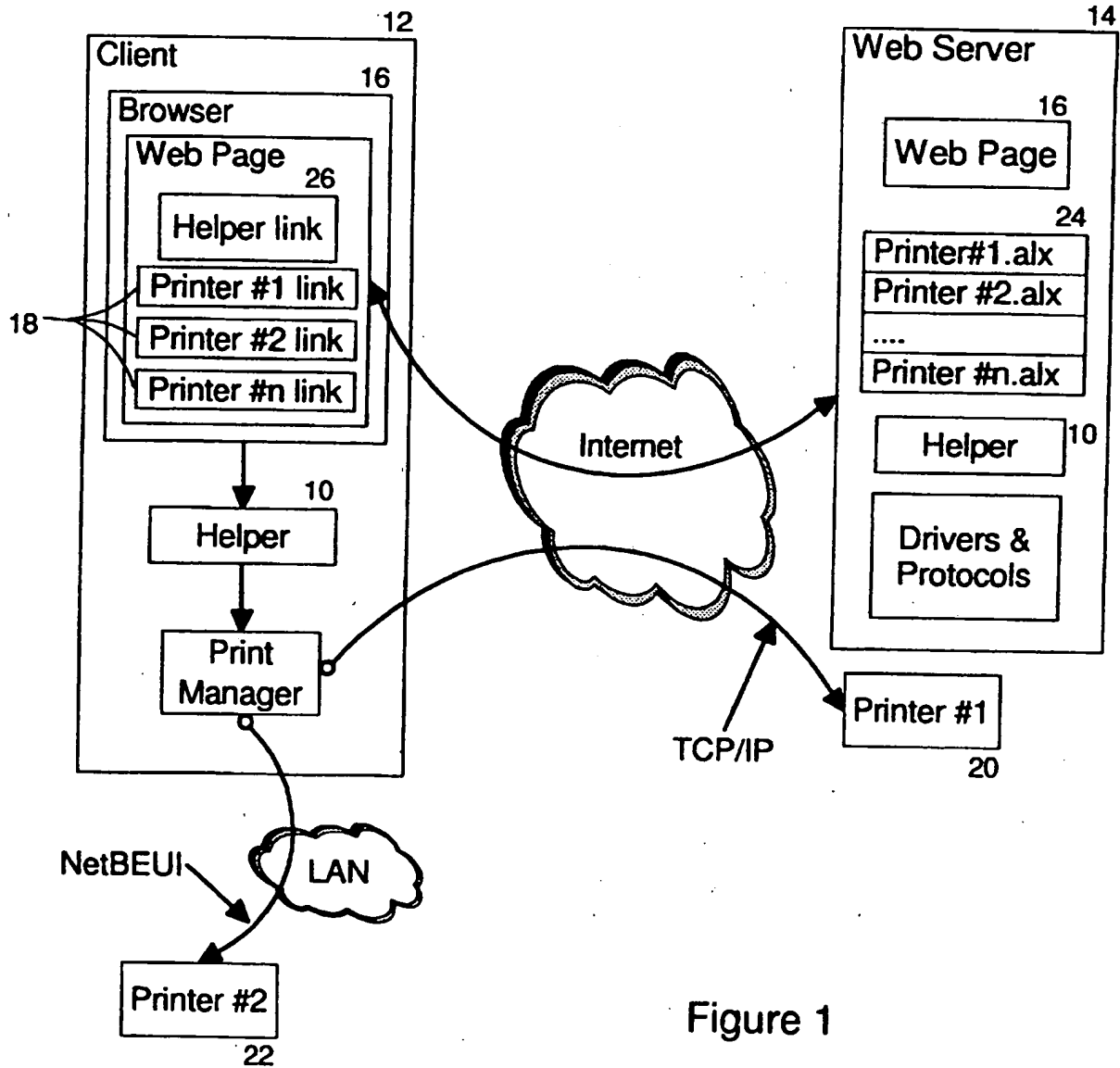
Figure 2

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Client 12

Browser 16

Web Page

Helper link 26

Printer #1 link
Printer #2 link
Printer #n link

18

Helper 10

Print Manager

Web Server 14

Web Page 16

Printer#1.alx
Printer#2.alx
....
Printer#n.alx
24

Helper 10

Drivers & Protocols

Internet

TCP/IP

Printer #1 20

NetBEUI LAN

Printer #2 22

Figure 1

Open Web Site

Download helper?

Select Printer 28

30 Check Critical File Dates → Download Fresh Files

32 Check Protocol → Download Protocol & Install

34 Check Driver Level → Download Driver & Install

Figure 2

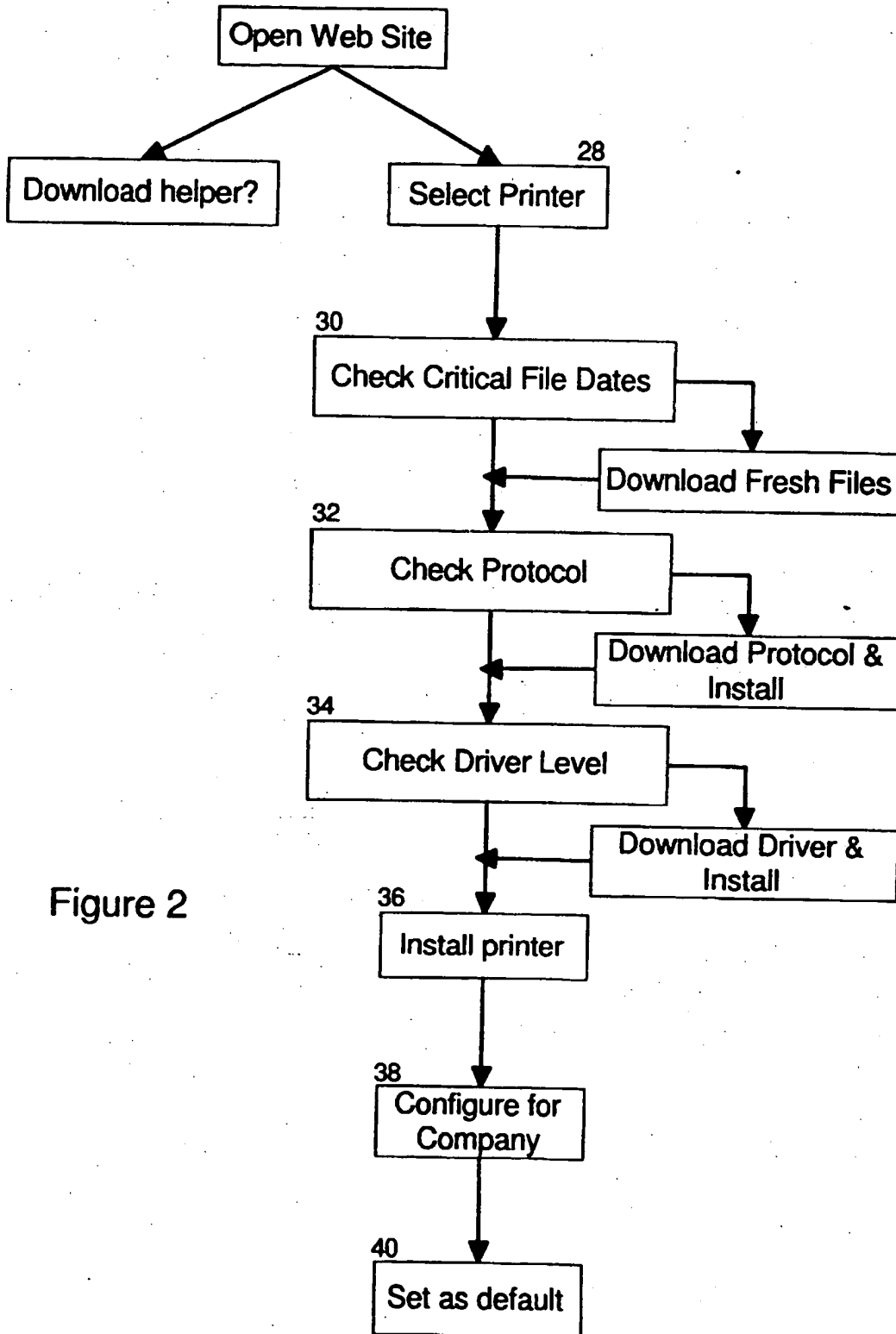36 Install printer

38 Configure for Company

40 Set as default

INTERNET BASED PRINTING

The present invention relates to a component for providing printer connectivity and a method for connecting to a printer.

Since the introduction of laptop computers and Personal Digital Assistants (PDA), computer users have become ever more mobile. Laptop computers, in particular, have become ever more powerful and compact, and both the computer and its accessories fit neatly into a briefcase. However, it is often not practical for a mobile user to also carry a printer, its leads and paper, and so such users are faced with the problem of how to print.

Even when a mobile user arrives at a site where printers may be available, it can be frustrating for the user to connect to the printer. The user must find out what printers are available, if printers are shared - find our their network address, locate and install appropriate drivers, and in some cases get LAN access to connect to a print server.

There is also another type of user who may wish to print material without direct access to a printer. Digital television viewers will increasingly be able to access Internet services through set-top boxes connected to their television and will from time to time need to print information. While the television may not be connected to a printer, such users may nonetheless wish to print out certain pages or forms which they may need to complete.

The present invention meets the printing requirement of the above types of users by providing a component for providing printer connectivity as claimed in the claim 1 and a method of connecting a workstation to a printer as claimed in claim 12.

Embodiments of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of a network including a printer connectivity component according to the invention; and

Figure 2 illustrates the operation of the printer connectivity component of Figure 1.

The operation of Internet browsers such as Communicator from Netscape Corporation or Internet Explorer from Microsoft Corporation is well known. Such browsers associate either a plug-in program to process Internet objects within the browser or designate a stand alone application to launch on selection of an Internet object. Helper

applications are usually conventional type applications written in, for example, the 'C' Programming language and must be present on the browser computer to allow their associated Internet objects to be processed. While the preferred embodiment is described in terms of a stand alone helper application, it will be seen that the invention is equally applicable to a plug-in program and the term "helper" is used in the specification to cover both types of program or any other program downloaded or installed once by a user to enable a browser to deal with objects of a given type.

Helpers are conventionally used, for example, when a HTML page being viewed on a browser includes a link to a multimedia file such as a .mpg file, and the user clicks on this link. The browser can either instantiate a plug-in which plays the file within the browser or launch the helper application associated with files of the .mpg extension to play the file outside the browser.

Referring now to Figure 1, the invention on the other hand uses a helper 10 installed on a client computer 12 connected to a web server 14 to allow a user to select from one or more printer object links 18 displayed on a web page 16 downloaded from the web server and have their workstation automatically enabled to print to that printer regardless of where the client computer 12 or the printer 20, 22 are located.

It will be seen from the following description that while the helper 10 according to the present embodiment is described in terms of the Windows operating system from Microsoft Corporation, the invention is operable with other operating systems such as OS/2 from IBM Corporation to configure a client machine to connect to a selected printer.

The preferred embodiment achieves this by allowing the user to download the helper application 10 appropriate to their operating system and the user's language onto their workstation from the Internet, although the helper may be obtained from any suitable source such as a LAN server or installation diskette. The helper is used to deal with files 24 that have a unique file extension of, for example, .alx. Each printer 20, 22 has one such unique .alx file associated with it, and each .alx file 24 is referenced in a web page link 18 so that when the page is displayed on a client browser, it can be selected by a user.

The web page for selecting a printer will usually also have a link 26 enabling a user to download and install the helper 10 from the server onto the client machine 12 to allow first time users to operate the system. Once the helper has been installed and the browser is configured in a conventional manner to associate the helper with files of the .alx

type, the user can select from any one of the printer links 18 displayed on the web page.

Referring now to Figure 2, on selecting a printer, step 28, the helper is instantiated and passed the .alx file across the Internet with its data becoming available for the helper to read. It is the interaction of the helper and the .alx file unique to a printer which enables the helper to ascertain: what protocol the printer is using, for example, NETBEUI for connection to a printer 22 on the same LAN as the client or TCPIP for connection to a printer 20 across the Internet; what printer driver the printer requires; and any other configuration details that may be required. Armed with this information the helper 10 deletes the .alx file from the workstation and sets about the task of automatically installing the protocol and/or printer driver and connecting to the printer.

It will be seen that protocols and printer drivers can be installed by any number of conventional means. Microsoft platforms supply a library which can be linked into the helper to allow the helper to make direct API calls to check for currently installed protocols and drivers and to install a protocol or printer driver. For other platforms, the helper may have to cause macros to execute or write files directly to disk to install a protocol.

The .alx file varies according to the protocol and driver etc that the printer as displayed to the user to choose from is using. Table #1 is a portion of typical example of a .alx file for a TCPIP based printer. In general, the *.alx file includes a core portion beginning with a label [DATA] which:

provides the helper with platform independent information, such as, the address of the printer given in the "args" field, and the protocol given in the "protocol" field;

tells the helper where in the .alx file to look for its platform's parameters, eg Windows 98 driver information is found at label [IBM Network Printer 17] pointed to by the "win98drv" field;

tells the helper where to look for data files by providing one or more sets of 3 fields "site", "pass" and "name". These fields contain the necessary information for the helper to know from where to get new versions of helper, protocol drivers and/or printer drivers according to the location of the user; and

gives the helper the dates for the latest version of driver in the "...drvdate" fields for each supported platform, so that the helper can check if locally installed drivers versions are up to date.

5. The remainder of the .alx file contains one or more platform dependent portions, each labelled with the contents of their respective "...drv" fields in the [DATA] portion. Table #1 only shows such a portion for a Windows 98 printer object using the "IBM Network Printer 17" print driver, but in a complete .alx file, similar portions would follow for

10 OS/2, Windows 3.1, and Windows NT platforms indicated in the [DATA] portion. Nonetheless, the exact information contained in these sections will vary for every single printer driver and operating system such is the complexity of modern print drivers.

15 In the present example, the portion of Table #1 following the [IBM Network Printer 17] label includes a list of fields that need to be passed to the Windows addprinterdriver() function to install the [IBM Network Printer 17] on a Windows platform. This function can be called once the required printer driver files have been placed in the

20 correct directory, eg windows\system for Windows '98.   -

In brief the fields are:

#drvfile which gives the helper the name of the driver file to download.

25 The driver for eg. an IBM Network Printer 17 may require several files (typically around 30) and so these are prepackaged on the software repository server 14 into a single self extracting file, in this case, IBM95.exe. This makes for a very fast download cutting down on network traffic and the time it takes to manually install a driver.

30
#version which in the present example is simply a parameter passed to the addprinterdriver() function. The helper actually determines the printer driver version by looking at specific file dates on the local workstation and comparing these to the contents of the appropriate "...drvdate"

35 field.

#drivername, the name of the driver, which is again passed to the addprinterdriver() function. The helper can determine if the printer is installed by calling another API function listing installed printer

40 drivers and searching for the driver name in the returned list.

#filelist which is a list of files on which the driver depends.

#environment which the operating system environment eg. Windows 98.

45

#datafile, #configfile, #driverpath, #helpfile, #monitor, #defaulttype
which are all downloaded driver configuration files passed to
addprinterdriver().

In more general terms the helper operates as follows:

A.   Check the "helperdate" field to determine that the helper
application itself is up to date, step 30. If not, the user is prompted
to update the helper, by using an IP connection to download a new version
from the web server 14 (or any other suitable server). In the example of
Table #1, only one IP address for a server 14 is given in the "site"
field and a password and username for the site are also provided in the
following fields. If more than one such IP address were provided, then
the helper could determine which server is fastest or closest and
download information from that site.

B.   Determine from the "protocol" field the protocol the printer
requires.

C.   Check the "protocoldate" field and the users platform to ascertain
if the protocol required is present and up to date, step 32. If not, the
user is asked if they wish to download the required protocol. If yes, the
helper initiates a protocol download using IP in a similar manner to
downloading the helper paragraph B. Once the appropriate files for a
protocol have been downloaded, the protocol is installed as appropriate
to the users platform.

D.   Once satisfied that the correct protocol is installed and at the
correct level, check if the printer driver is installed. For Microsoft
platforms an API call can be made returning a list of installed printers.
Even if installed, the "driverdate" field needs to be checked to
determine if the correct driver for the printer is available on the users
machine, step 34. If not one is automatically downloaded from the nearest
software repository as described in paragraph B above using IP.

E.   Once satisfied that the correct protocol and driver are available,
the helper installs a printer object on the users platform, step 36. In
the case of Windows '98, this is done with a further API call
addprinter().

F.   Configure the printer object in accordance with requirements of the
company/user, step 38. Company specific configuration information is held
in the "a4file" field which points to a configuration file. In the
present example, the file 431795.cfg contains special configuration data.
It is preferably downloaded with the packaged driver file, in this case
IBM95.EXE. It is used to set specific settings within the print driver

rather than relying on the manufacturers defaults. For example, a company may decide that all its users should use duplex printing to save on paper costs. The helper can do this using the data in this file to set the correct paper size, tray settings etc.

G.   Finally, once installed the printer is preferably set as the default printer, step 40.

It will be seen that there are a number of advantages to the present invention:

A.   It is web based and therefore can be made available to anyone on the internet, this could include digital TV.

B.   Users never have to worry about having the right level driver or which printer to set as a default. With a plethora of print objects on the desktop this is always a problem. Preferably, the helper uses a single reconfigurable object, always set as the default, which makes for great ease of use.

C.   The .alx file can be encrypted to provide for a greater level of corporate security should this be necessary. This is particularly useful, if a printer is to be password protected. The .alx file of Table #1 includes a "password" field. If this is populated, the helper knows to ask the user for a password before installing the printer. Without encryption, however, the user could simply save the .alx file and look at the password field to obtain the password.; and

D.   It does away with the need for FAX machines, which is the solution usually employed by mobile users without printing facilities.

It will be seen that the invention is not limited to the NETBEUI or TCP/IP protocols mentioned above. Other protocols are, for example, IPP (Internet Printing Protocol) which is a Java based printing protocol being jointly developed by a consortium of companies to deal with some of the problems the present invention overcomes. The invention can also operate with PSM (Printing Systems Manager) also called PSF (Printing Submit Format) or InfoPrint, an IBM developed printing protocol, which is in essence an IP based protocol that puts print jobs into a certain format so that they can be received by an AIX print server.

It will also be seen that printer objects can be divided according to category. Each category can preferably be linked to from an index page. In a preferred embodiment, the index page contains a map, and printers are divided into geographical areas. Thus, a mobile user simply needs to connect to the Internet, select the index page, select the

geographical area in which a required printer is located (this need not correspond with his actual location), select the printer from the page associated with the geographical area which causes the helper to install the printer, and then print as normal.

It should also be seen that the .alx file for a printer need not be located on a remote web site. It is also possible for a user to browser either through local drives, LAN network drives or Intranet sites to access a required .alx file. This of course removes much of the ease of use of the preferred embodiment, as the user may then need to acquire suitable password access to a LAN network or to know more about the location of .alx files than is necessary. Nonetheless, the invention is applicable to any helper operating with a printer configuration file accessed from a browser to configure a workstation to connect to a printer.

The preferred embodiment has been described in terms of the helper component configuring the browser's workstation to enable the workstation to connect to a printer. It will be seen, however, that the helper may in some cases need to communicate with and possibly configure a server controlling a printer to make said server receptive to print requests from the workstation and the term enable should be interpreted to cover any combination of remote or local configuration required to enable the workstation to connect to the required printer.

Table #1

```
[DATA]
protocol=IP
type=IBM 4039
args=IPADDRESS=9.180.145.227;QUEUE=PRT12
os2drv=IBMNPPS.IBM Network Color Printer
win16drv=ADOBEPS.IBM Network color Printer
win98drv=IBM Network Printer 17
winntdrv=IBM Network color Printer
password=
helperdate=18/2/1999
protocoldate=31/01/1998
driverdate=12/10/1998
os2drvdate=4/3/1999
win16drvdate=23/3/1998
win98drvdate=24/5/1996
winntdrvdate=12/2/1997
site=9.180.145.227
pass=prtdrv
name=prtdrv


[IBM Network Printer 17]
drvfile=IBM95.EXE
a4file=431795.CFG
version=1024
drivername=IBM Network Printer 17
environment=Windows 4.0
datafile=IBM43171.PPD
driverpath=ADOBEPS4.DRV
configfile=ADOBEPS4.DRV
helpfile=ADOBEPS4.HLP
monitor=PostScript Language Monitor
defaulttype=RAW
filelist=IBM43171.PPD,col143xx.dll,IBM43171.DLL,adobeps4.drv,adobeps4.hlp
,pscript.ini,fonts.mfm,iconlib.dll,psmon.dll
```

CLAIMS

1. A printer connectivity component cooperable with a web browser to connect a workstation to a printer, said component comprising:

   means instantiable to read a configuration file, comprising data defining a connection to said printer, accessed from the browser;

   means, responsive to said configuration file data, to enable said workstation to connect to said printer.

2. A component as claimed in claim 1 wherein the component is one of a helper application or a browser plug-in.

3. A component as claimed in claim 1 wherein said file comprises respective fields indicating said printer's location, a protocol for connecting to said printer at said location and a driver required for said printer, and said component comprises:

   means for checking if said workstation is configured to use said protocol and said driver; and

   means for installing said protocol and said driver.

4. A component as claimed in claim 3 wherein said file further includes fields indicating said protocol and said printer driver dates and said component comprises:

   means for checking the dates of installed versions of said protocol and said driver and wherein said means for installing is responsive to said protocol or said driver being out of date to install a new version of said protocol or driver.

5. A component as claimed in claim 3 wherein said file comprises one or more fields indicating one or more locations from which new versions of said protocol and said driver can be accessed and said component comprises:

   means for connecting to the or each location to download said protocol and said driver.

6. A component as claimed in claim 5 wherein said file further includes a field indicating a date for a helper and said components comprises:

means for checking the dates of installed version of said component and wherein said means for installing is responsive to said component being out of date to install a new version of said component.

7.   A component as claimed in claim 1 wherein said configuration file includes platform dependent information for each workstation platform that is to connect to said printer and said component.

8.   A web server including the printer connectivity component of claim 1, one or more of said configuration file, each associated with a respective printer and one or more web pages, each including one or more links to a respective configuration file.

9.   A web server as claimed in claim 8 wherein one of said web pages includes a reference to said component.

10.   A web server as claimed in claim 8 wherein one of said web pages includes a map, portions of which are associated with respective web pages including links to said configuration files.

11.   A computer program product comprising computer program code stored on a computer readable storage medium for, when executed on a computer, connecting a workstation to a printer, the program code comprising a printer connectivity component according to claim 1.

12.   A method of connecting a workstation running a web browser to a printer comprising the steps of:

said browser, accessing a printer configuration file, said file comprising data defining a connection to said printer;

said browser, responsive to receipt of said configuration file, instantiating a component associated with said configuration file type; and

said component, responsive to said configuration file data, enabling said workstation to connect to said printer.

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Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q):   G4A (AFGDC AFL)

Int Cl (Ed.6):   G06F (3/12 13/10)

Other: Online: WPI, EPODOC, PAJ, COMPUTER, selected Internet sites

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,E	EP 0 918 291 A2 (XEROX) See e.g. columns 7,8 and the figures	1,12 at least
X	EP 0 872 792 A2 (ADOBE) See whole document, e.g. column 4 line 27 to column 6 line 026, column 8 lines 22-34 and the figures	1,12 at least
X,E	WO 99/15955 A1 (EASTMAN KODAK) See whole document, e.g. pages 2,7-11 and the figures	1,12 at least
X	"Intranet Connect" 1998, available via the internet, http://www.banyan.com/products/connect/prodbrf.html or http://www.banyan.com/pdfs/connect15.pdf (pdf version)	1,12 at least
X	"IETF moves closer to standard Internet Printing Protocol" (Ephraim Schwartz) 06.11.1997, available via the internet, http://archive.infoworld.com/cgi-bin/displayStory.pl?97116.wipp.htm	1,12 at least
X	"Spreading The Net" (Laurel Brunner) August 1996, available via the internet, http://www.dotprint.com/fgen/internet.htm	1,12 at least

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Application No:	GB 9905691.3	Examiner:	Ben Micklewright
Claims searched:	1-12	Date of search:	21 October 1999

Category	Identity of document and relevant passage	Relevant to claims
X	"Adobe Unveils Internet-Based Printing Service" 07.05.1996, available via the internet, http://www31.netscape.com/newsref/pr/newsrelease140.html	1,12 at least

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